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NOV 21 2007

Docket No.: 2328-062

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	
DHINDSA, Rajinder <i>et al.</i>	:	Confirmation No. 8414
U.S. Patent Application No. 10/645,665	:	Group Art Unit: 2821
Filed: August 22, 2003	:	Examiner: Tung X Le
For: MULTIPLE FREQUENCY PLASMA ETCH REACTOR		

DECLARATION UNDER 37 CFR 1.131

We, Rajinder Dhindsa, Eric Lenz, Mukund Srinivasan, Aaron Eppler, Lumin Li, Felix Kozakevich, Camelia Rusu, Dave Trussel, Reza Sadjadi, Jim Tietz, and Jeff Marks, the applicants of the referenced application hereby declare as follows:

1. Prior to August 1, 2003, we successfully reduced to practice a vacuum plasma processor comprising a vacuum chamber having a (a) lower electrode including an electrostatic chuck (ESC) that carried a workpiece in the form of a semiconductor wafer and (b) an upper electrode, wherein a frequency of 40 MHz was applied to the upper electrode and frequencies of 27 MHz and 2 MHz were applied to the bottom electrode. Exhibit 1 is a cross-sectional view of the vacuum chamber that was operated under these conditions. The vacuum chamber illustrated in Exhibit 1 was modified so that (a) 47 MHz (instead of 27 MHz) was applied to the upper electrode at the same time that (b) 27 MHz and 2 MHz (instead of 2 MHz) were applied to the 200 mm electrostatic chuck (ESC) included in the bottom electrode.

2. Exhibits 2 and 3 are microphotographs of three different semiconductor wafers that were successfully etched prior to August 1, 2003 with the arrangement described in Paragraph 1, wherein the upper and lower electrodes are respectively indicated in Exhibits 2 and 3 by UE and LE. The microphotographs of Exhibits 2 and 3 include dates that are prior to August 1, 2003, but have been redacted.

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130.00 OP

Application No.: 10/645,665**Docket No.: 2328-062**

3. For the left microphotographs of Exhibits 2 and 3, 900 W at 40 MHz was applied to the upper electrode, while 300 W at 27 MHz and 1800 W at 2 MHz were applied to the lower electrode. For the center microphotographs of Exhibits 2 and 3, 600 W at 40 MHz was applied to the upper electrode, while 600 W at 27 MHz and 1800 W at 2 MHz were applied to the bottom electrode. For the right and microphotographs of Exhibits 2 and 3, 300 W at 40 MHz was applied to the upper electrode, while 900 W and 27 MHz and 1800 watts at 2 MHz were applied to the bottom the electrode. In all instances, the vacuum chamber was operated at a vacuum pressure of 50 millitorr and the etchant, i.e., processing, gas was a mixture of argon, C4F8 and oxygen.


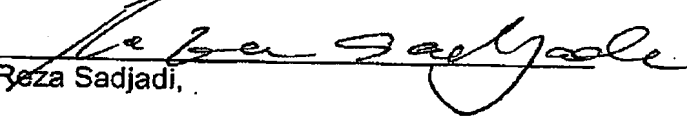
4. The microphotographs of Exhibits 2 and 3 include clear indications of holes that were successfully bored into the semiconductor wafers and that the holes bored in the different wafers had different characteristics for the different powers that were applied to the different frequencies.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, or imprisonment, or both, under

Application No.: 10/645,665Docket No.: 2328-062

Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATED this _____ day of September, 2007, at _____.


Rajinder Dhindsa,
Eric Lenz_____
Mukund Srinivasan,_____
Aaron Eppler
Lumin Li,
Felix Kozakevich
Camella Rusu
Dave Trussel
Reza Sadjadi,

CERTIFICATION OF FACSIMILE TRANSMISSION

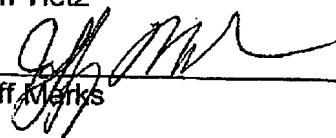
I HEREBY CERTIFY THAT THIS PAPER IS BEING FACSIMI-
LE TRANSMITTED TO THE PATENT AND TRADEMARK OFFICE
ON THE DATE SHOWN BELOW

CHRISTINA FRYE

TYPE OR PRINT NAME OF PERSON SIGNING CERTIFICATION


SIGNATURE11/21/07
DATE571 273 8300

FACSIMILE NUMBER

Jim Tietz
Jeff Marks

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James V. Tietz

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Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATED this 8th day of November ~~September~~, 2007, at 11:45A.

Rajinder Dhindsa,

Eric Lenz

Mukund Srinivasan,

Aaron Eppler

Lumin Li,

Felix Kozakevich

Camelia Rusu

Dave Trussei

Reza Sadjadi,

James V. Jim Tietz

Jeff Marks

CERTIFICATION OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY THAT THIS PAPER IS BEING FACSIMI-
LE TRANSMITTED TO THE PATENT AND TRADEMARK OFFICE

ON THE DATE SHOWN BELOW

CHRISTINA FRYE

TYPE OR PRINT NAME OF PERSON SIGNING CERTIFICATION

Christina Frye 11/21/07

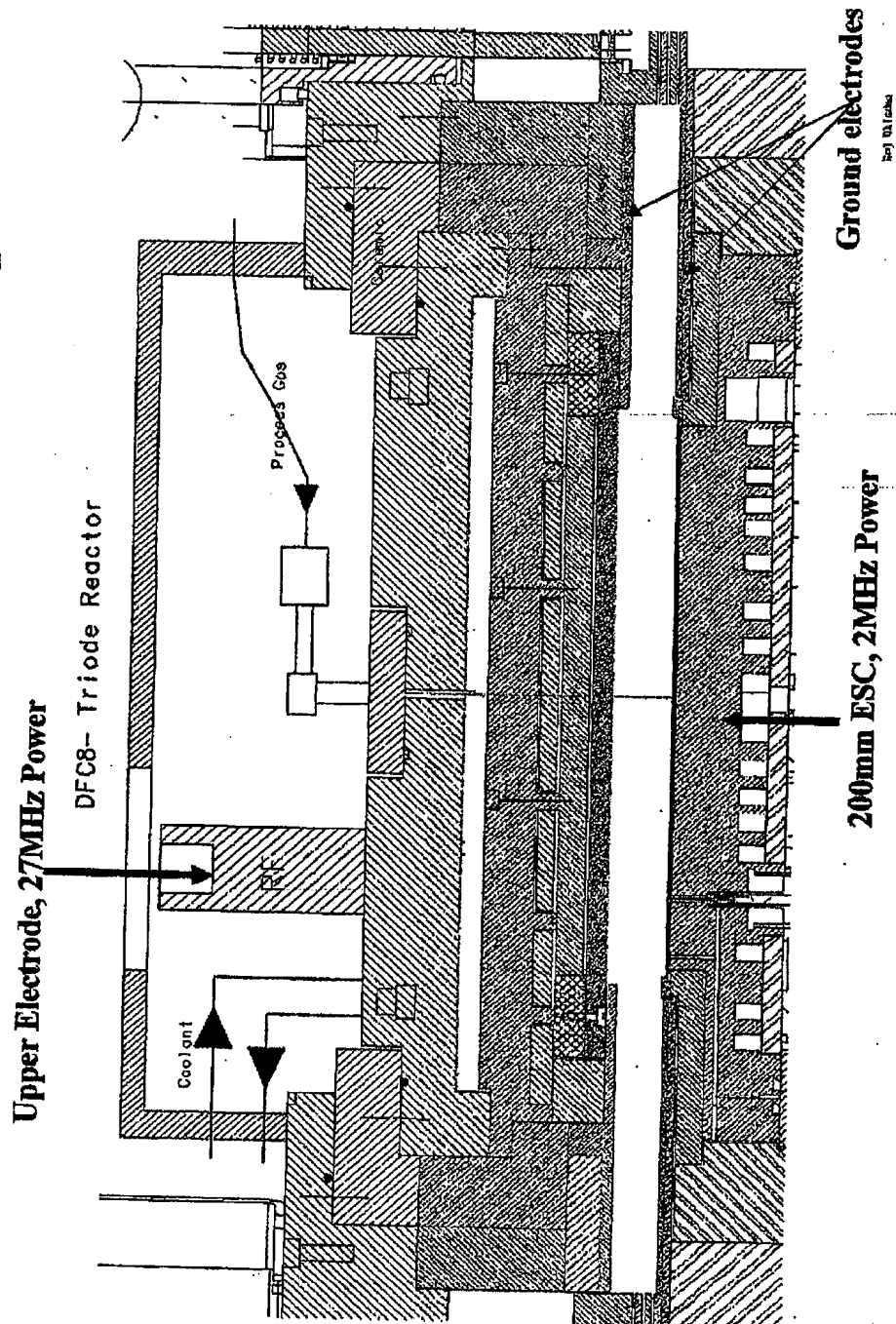
SIGNATURE

DATE

571 273 8300

FACSIMILE NUMBER

DFC 8: Triode Split Power Configuration



Area ratio ~ 2.0. 27Mhz from top electrode, 2 Mhz from bottom electrode. Ground is outside upper electrode OD and at lower ground ring.

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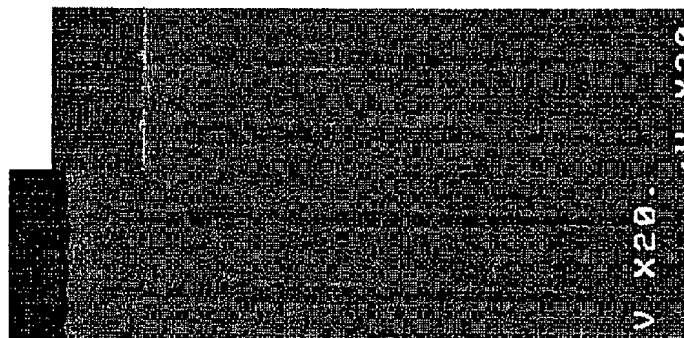
EXN1817-1

Triode - Three Frequencies Test_40 MHz UE/27, 2MHz LE

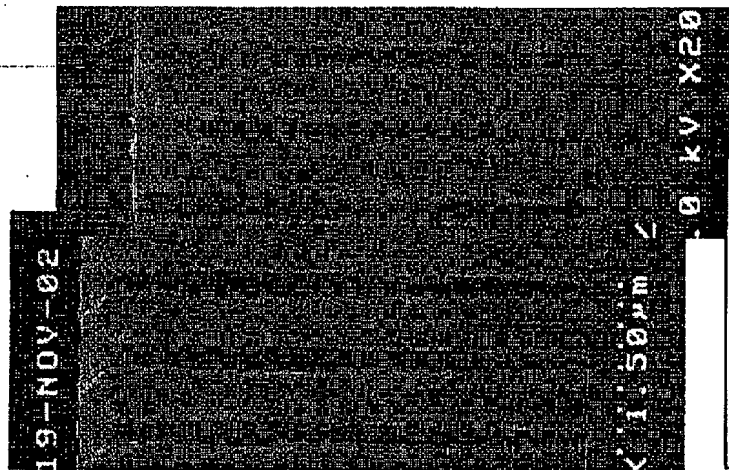
Power Ratio Effect- Profile response

DFC8 Recipe

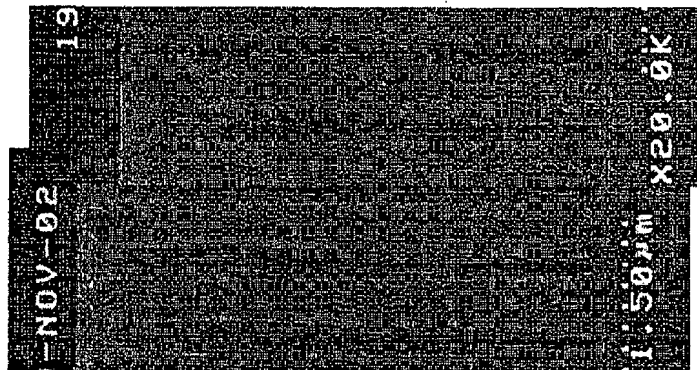
50 mT/ x1 W(40)/ x2 W(27)/ x3 W(2)/ 450 A/ 28 C4F8/ 10 O2/ 0 C LE/ 20 Torr Hal/ 20 C-High T_UE/ 230s



PR (w BARC) =4200 A
ED=3.00um



PR (w BARC) =3400 A
ED=3.02 um



PR (w BARC) =2270 A
ED=3.12 um

900₄₀/300₂₇, 1800₂600₄₀/600₂₇, 1800₂300₄₀/900₂₇, 1800₂

Ratio 40 MHz/ 27 MHz, 2 MHz



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EXHIBIT 2

